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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,589	01/28/2004	Yoshimi Kanno	S004-5200	3890
40627	7590	10/26/2006		EXAMINER CANTELMO, GREGG
ADAMS & WILKS 17 BATTERY PLACE SUITE 1231 NEW YORK, NY 10004			ART UNIT 1745	PAPER NUMBER

DATE MAILED: 10/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/766,589	KANNO ET AL.	
	Examiner	Art Unit	
	Gregg Cantelmo	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on ____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) ____ is/are allowed.
- 6) Claim(s) 1-9 is/are rejected.
- 7) Claim(s) ____ is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 28 January 2004 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____ . | 6) <input type="checkbox"/> Other: ____ . |

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on February 13, 2003. It is noted, however, that applicant has not filed a certified copy of the Japanese application as required by 35 U.S.C. 119(b).

Information Disclosure Statement

2. No IDS appears to have been filed with the application prior to this office action. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Drawings

3. Figure 4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office

action. The objection to the drawings will not be held in abeyance. This cell structure appears to be a conventional design as evidenced by Fig. 1 of JP 2002-117841.

Specification

4. The disclosure is objected to because of the following informalities: the term "true polymer" on page 8, line 12 is objected to since it is unclear as to what material(s) was/were specifically recognized as being a "true polymer" by the claimed invention at the time the invention was made. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for particular coating materials for the negative pole active material (notable PTFE and PVDF), does not reasonably provide enablement for generic "oil repellent materials". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The specification does not define what specific oil(s) are exemplary of those materials which the instant claims coatings are repellent to. Since the nature of the oil repellency is not reasonably described nor disclosed in the instant application, the particular claimed invention extends beyond the scope of that which the specification enables. Further review of the specification still

fails to clearly define the claimed materials since it is unclear as to what the term "true polymer" specifically encompasses.

6. Claim 4 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The term "oil repellent conductive agent" is not reasonably defined in the written description. There are no examples or detailed disclosure to fully ascertain what materials constitute the claimed "oil repellent conductive agent" nor is it clear as to how this material is conductive since the specification does not define the nature of the conductivity of the claimed agent. Thus the term "oil repellent conductive agent" as claimed fails to comply with the enablement requirement and is rejected under 35 U.S.C., first paragraph.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. The term "oil repellent" in claims 1-9 is a relative term which renders the claims indefinite. The term "oil repellent" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope

of the invention. The term is vague with respect to the oil(s) which the claimed and disclosed invention held as being exemplary oils to which the claimed oil repellent material repels. It is unclear if the oil is a specific oil present in the cell or repellent to external oils. Further there is a vast and wide array of oils known to exist which have significantly different properties. Thus without any teaching in the specification as to which oil(s) the inventive oil repellent material is directed to, it is impossible to ascertain the breadth of the claimed invention. Further review of the specification still fails to clearly define the claimed materials since it is unclear as to what the term "true polymer" specifically encompasses. Thus the term "oil repellent" is indefinite;

b. The phrase "a separating for separating" is indefinite. It may be that the phrase should be "a separator for separating". Clarification is respectfully requested;

c. The term "oil repellent conductive agent" in claim 4 is a relative term which renders the claim indefinite. The term "oil repellent conductive" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term is vague with respect to the any materials which are exemplary of the claimed "oil repellent conductive agent" thus failing to provide reasonable disclosure to one of ordinary skill in the art as to what such materials were appreciated and applied to the disclosed and claimed invention. Thus the term "oil repellent conductive agent" is indefinite;

d. Claim 8 recites the limitation "the atmospheric pressure" in line 3. There is insufficient antecedent basis for this limitation in the claim. Furthermore this term is indefinite since atmospheric pressure is a variable dependent upon other conditions such as altitude and temperature. Thus for example the atmospheric pressure in Denver is significantly different from atmospheric pressure at sea level. This also applies to claim 9.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

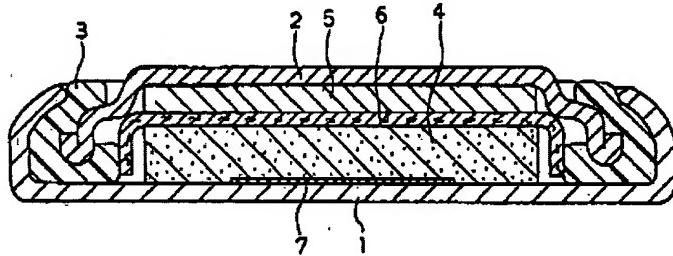
1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1, 3-5 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,274,277 (Mori) in view of U.S. Patent No. 6,287,727 (Horie).

Mori discloses of a non-aqueous electrochemical cell comprising: a positive pole 4, negative pole 5, an organic non-aqueous electrolyte liquid and supporting salt (col. 3, II. 40-47), a separator 6 to separate the poles 4 and 5, and a gasket 3 (Fig. 1 as applied to claim 1).



The positive pole active material of Mori is a lithium-containing manganese oxide (col. 10, II. 40-45 as applied to claim 5).

The negative pole active material is a lithium-aluminum alloy (col. 10, II. 52-56 as applied to claim 7).

Polyphenylene sulfide used for the separator and the gasket of the present invention has been selected from the viewpoint of stability against the electrolyte as well as thermal resistance. Polyphenylene sulfide has a thermosoftening temperature of not less than 200.degree. C. and is free from heat distortion at the temperature of about 250.degree. C., if a filler such as glass fiber is added (col. 8, II. 5-14). Also, it is

preferable that said gasket is made of polyphenylene sulfide (col. 3, ll. 15-18).

Tetraglyme has a boiling point of 275.degree. C., which is higher than the internal temperature of the Reflow furnace. Thus, in the temperature range of around 250.degree. C., Tetraglyme is in a stable condition, though it has a rather high vapor pressure (as applied to claim 8).

The difference between claims 1, 3 and 4 and Mori is that Mori does not disclose providing the claimed "oil repellant material."

Horie teaches of a Li-Mn-O positive electrode composition (col. 1, ll. 63-65) which is further provided with an ion conducting polymer coating on the active material (col. 2, ll. 43-52). The materials therein include PVDF and thus exemplifies an "oil repellant material" absent any definition as to what constitutes the claimed oil repellency (as applied to claims 1, 3 and 4).

The motivation for providing the PVDF polymer coating to the active material is to suppress dissolution of manganese from the positive electrode and increase the lifetime of the battery (col. 1, ll. 23-26).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Mori by providing the PVDF polymer coating to the active material since it would have suppressed dissolution of manganese from the positive electrode and increase the lifetime of the battery.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of Horie as applied to claims 1 and 5 above, and further in view of Thackeray et al

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"Spinel Electrodes from the Li-Mn-O system for rechargeable lithium battery applications" (hereafter referred to as Thackeray) .

The difference not yet discussed is of the lithium-containing manganese being $\text{Li}_4\text{Mn}_5\text{O}_{12}$.

Each or Mori and Horie are directed to lithium secondary batteries which employ lithium-containing manganese positive electrode active materials.

Thackeray teaches of the lithium-containing manganese positive active material being $\text{Li}_4\text{Mn}_5\text{O}_{12}$ (abstract). This material shows excellent capacity retention and cycling (page 365, first column, last paragraph).

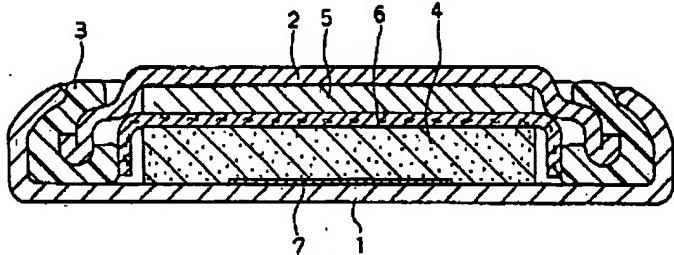
Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Mori by selecting the lithium-containing manganese positive active material to be $\text{Li}_4\text{Mn}_5\text{O}_{12}$ since it would have provided a positive electrode active material having excellent capacity retention and cycling. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v.*

Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

10. Claims 1-5 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,274,277 (Mori) in view of JP 2002-373643 A (JP '643).

Mori discloses of a non-aqueous electrochemical cell comprising: a positive pole 4, negative pole 5, an organic non-aqueous electrolyte liquid and supporting salt (col. 3,

II. 40-47), a separator 6 to separate the poles 4 and 5, and a gasket 3 (Fig. 1 as applied to claim 1).



The positive pole active material of Mori is a lithium-containing manganese oxide (col. 10, II. 40-45 as applied to claim 5).

The negative pole active material is a lithium-aluminum alloy (col. 10, II. 52-56 as applied to claim 7).

Polyphenylene sulfide used for the separator and the gasket of the present invention has been selected from the viewpoint of stability against the electrolyte as well as thermal resistance. Polyphenylene sulfide has a thermosoftening temperature of not less than 200.degree. C. and is free from heat distortion at the temperature of about 250.degree. C., if a filler such as glass fiber is added (col. 8, II. 5-14). Also, it is preferable that said gasket is made of polyphenylene sulfide (col. 3, II. 15-18).

Tetraglyme has a boiling point of 275.degree. C., which is higher than the internal temperature of the Reflow furnace. Thus, in the temperature range of around 250.degree. C., Tetraglyme is in a stable condition, though it has a rather high vapor pressure (as applied to claim 8).

The differences between claims 1-4 and Mori are that Mori does not disclose providing the claimed "oil repellent material" (claims 1, 3 and 4) or of the "oil repellent material" being a powder (claim 2).

JP '643 discloses providing a particulate coating onto the surface of the positive active material of a lithium secondary battery wherein the particulate coating includes PVDF particles 2 (Fig. 1 and paragraph [0018]).

The motivation for providing the coating of JP '643 which includes particulate "oil repellent" polymers such as PVDF to the active material is to improve the charge and discharge characteristics of the cell (paragraphs [0014]-[0015]).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Mori by providing the coating of JP '643 including an "oil repellent" polymer component such as a PVDF particulate to the active material since it would have improved the charge and discharge characteristics of the cell.

11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of JP '643 as applied to claims 1 and 5 above, and further in view of Thackeray et al "Spinel Electrodes from the Li-Mn-O system for rechargeable lithium battery applications" (hereafter referred to as Thackeray) .

The difference not yet discussed is of the lithium-containing manganese being Li₄Mn₅O₁₂.

Each of Mori and JP '643 are directed to lithium secondary batteries which employ lithium-containing manganese positive electrode active materials.

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Thackeray teaches of the lithium-containing manganese positive active material being Li₄Mn₅O₁₂ (abstract). This material shows excellent capacity retention and cycling (page 365, first column, last paragraph).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Mori by selecting the lithium-containing manganese positive active material to be Li₄Mn₅O₁₂ since it would have provided a positive electrode active material having excellent capacity retention and cycling. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

12. Claims 1 and 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0127467 (Watanabe) in view of U.S. Patent No. 6,287,727 (Horie) and Thackeray.

Watanabe discloses of a non-aqueous electrochemical cell comprising: a positive pole 101, negative pole 104, an organic non-aqueous electrolyte liquid and supporting salt (paragraph [0087]), a separator 109 to separate the poles, and a gasket 108 (Fig. 1 as applied to claim 1).

The positive pole active material of Watanabe includes various lithium compounds including lithium-containing manganese oxide (paragraph [0031] as applied to claim 5).

The negative pole active material is a lithium-aluminum alloy (paragraph [0030] as applied to claim 7).

The non-aqueous solvent is a mixture of ethylene carbonate and gamma-butyrolactone and the supporting salt is LiBF₄ (paragraph [0087]). The gasket material includes LCP, PPS, PFA, PEEK and PEN (paragraph [0049] as applied to claims 8 and 9).

The differences between claims 1 and 3-6 and Watanabe are that Watanabe does not disclose providing the claimed "oil repellent material (claims 1, 3 and 4) or of an example wherein the active material is a lithium-containing oxide (claims 5-6).

As discussed above, Watanabe does suggest that the teachings therein can be used in conjunction with Li-Mn-O positive electrode compositions. A manganese-based oxide is especially active, and must be carefully handled to control its quantity, when it is used for the positive electrode (paragraph [0031] or Watanabe).

While no specific Li-Mn-O examples are shown, there is ample motivation to use a manganese-based oxide as the positive electrode material.

Thackeray teaches of the lithium-containing manganese positive active material being Li₄Mn₅O₁₂ (abstract). This material shows excellent capacity retention and cycling (page 365, first column, last paragraph).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Watanabe by selecting the lithium-containing manganese positive active material to be Li₄Mn₅O₁₂ since it would have provided a positive electrode active material having excellent capacity retention

and cycling. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

Considering that the selection of the positive active material to be a Li-Mn-O composition is rendered obvious in light of Watanabe in view of Thackeray, it is further considered obvious to apply the claimed "oil repellent material" coating from the following:

Horie teaches of a Li-Mn-O positive electrode composition (col. 1, ll. 63-65) which is further provided with an ion conducting polymer coating on the active material (col. 2, ll. 43-52). The materials therein include PVDF and thus exemplifies an "oil repellent material" absent any definition as to what constitutes the claimed oil repellency (as applied to claims 1, 3 and 4).

The motivation for providing the PVDF polymer coating to the active material is to suppress dissolution of manganese from the positive electrode and increase the lifetime of the battery (col. 1, ll. 23-26).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Watanabe in view of Thackeray by providing the PVDF polymer coating to the active material is to suppress dissolution of manganese from the positive electrode and increase the lifetime of the battery.

13. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0127467 (Watanabe) in view of JP '643 and Thackeray.

Watanabe discloses of a non-aqueous electrochemical cell comprising: a positive pole 101, negative pole 104, an organic non-aqueous electrolyte liquid and supporting salt (paragraph [0087]), a separator 109 to separate the poles, and a gasket 108 (Fig. 1 as applied to claim 1).

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The differences between claims 1 and 3-6 and Watanabe are that Watanabe does not disclose providing the claimed "oil repellent material" (claims 1, 3 and 4), of the "oil repellent material" being a powder (claim 2), or of an example wherein the active material is a lithium-containing oxide (claims 5-6).

As discussed above, Watanabe does suggest that the teachings therein can be used in conjunction with Li-Mn-O positive electrode compositions. A manganese-

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While no specific Li-Mn-O examples are shown, there is ample motivation to use a manganese-based oxide as the positive electrode material.

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Considering that the selection of the positive active material to be a Li-Mn-O composition is rendered obvious in light of Watanabe in view of Thackeray, it is further considered obvious to apply the claimed "oil repellent material" coating from the following:

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JP '643 discloses providing a particulate coating onto the surface of the positive active material of a lithium secondary battery wherein the particulate coating includes PVDF particles 2 (Fig. 1 and paragraph [0018] as applied to claims 1-4).

The motivation for providing the coating of JP '643 which includes particulate "oil repellant" polymers such as PVDF to the active material is to improve the charge and discharge characteristics of the cell (paragraphs [0014]-[0015]).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Watanabe in view of Thackeray by providing the coating of JP '643 including an "oil repellant" polymer component such as a PVDF particulate to the active material since it would have improved the charge and discharge characteristics of the cell.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


gc
October 25, 2006

Gregg Cantelmo
Primary Examiner
Art Unit 1745